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Nuclear Weapon Life Cycle

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Nuclear Weapon Life Cycle

Presentation Overview:

- Processes of Nuclear Weapon Life Cycle
- Joint Nuclear Weapon Life Cycle Responsibilities
- Key Players in the Life Cycle Process
- Joint Nuclear Weapon Life Cycle Phases
- The Phase 6.X Process
- Refurbishment Activities
- Questions



What Do You Think?

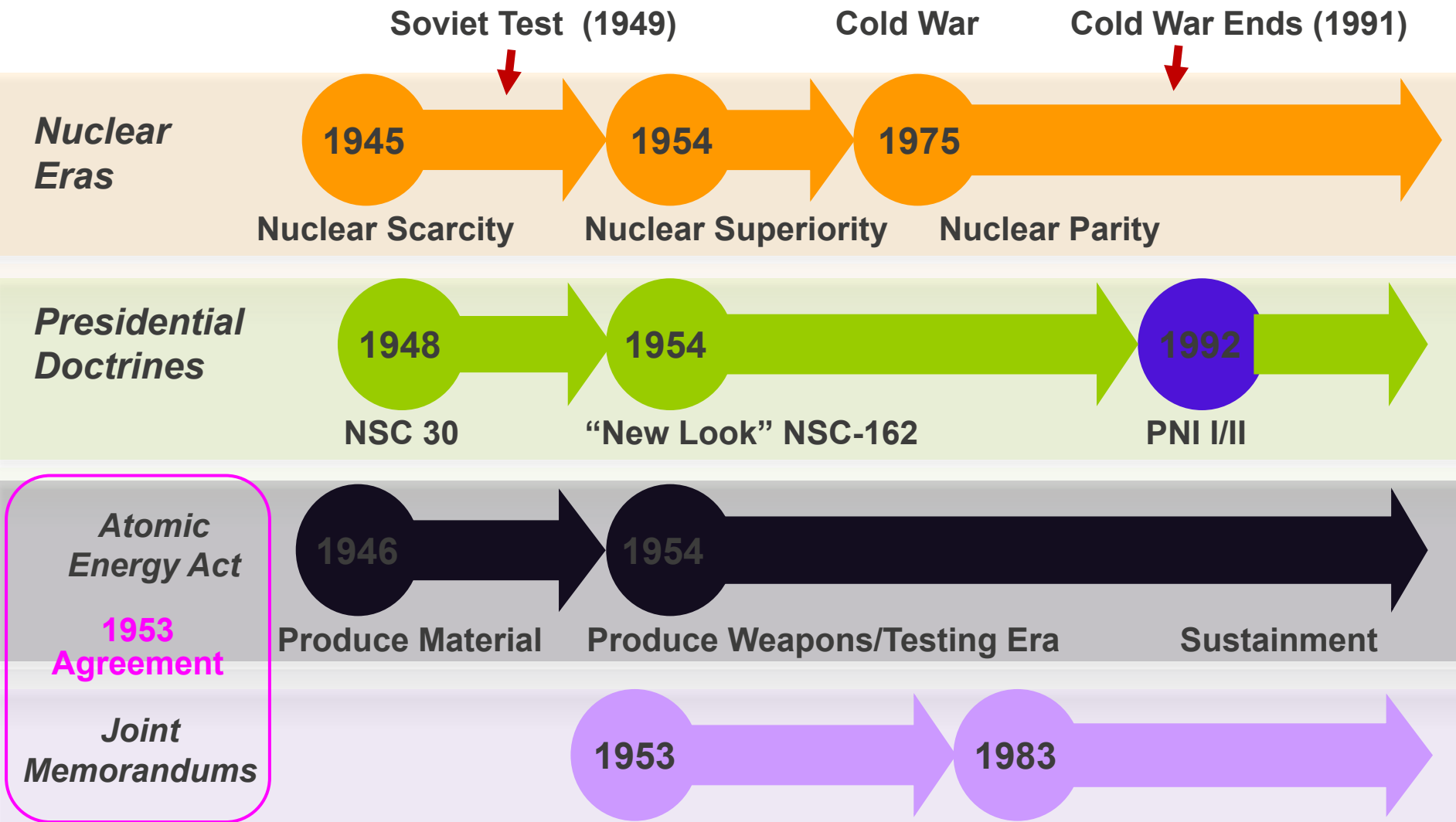
- Why should we think about the nuclear weapon life-cycle?
- What types of weapons are needed in the stockpile?
- What size stockpile is required?

Processes of Nuclear Weapon Life Cycle

Definition: Nuclear weapons life-cycle

- Total phases through which a nuclear weapon passes from the time it is initially developed until the time it is either consumed in use, retired, dismantled, or disposed of

Evolution of Nuclear Weapons



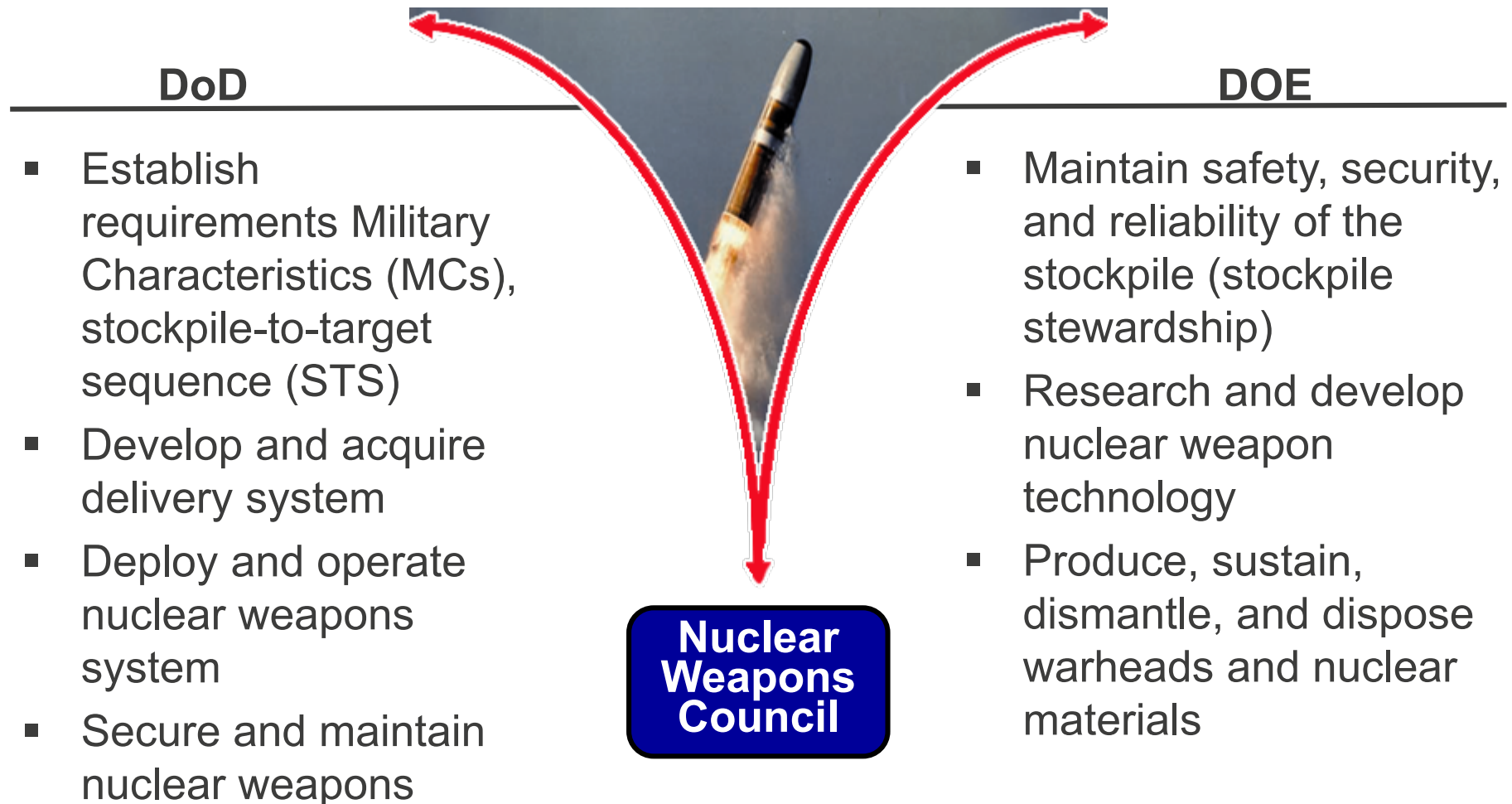
The 1953 Agreement

- **Established basic departmental responsibilities and the development processes**
 - Officially called the 1953 Agreement Between the Atomic Energy Commission (AEC) and the Department of Defense (DoD) for the Development, Production, and Standardization of Atomic Weapons
- **Established joint DoD/DOE (AEC) life-cycle process**

The 1953 Agreement

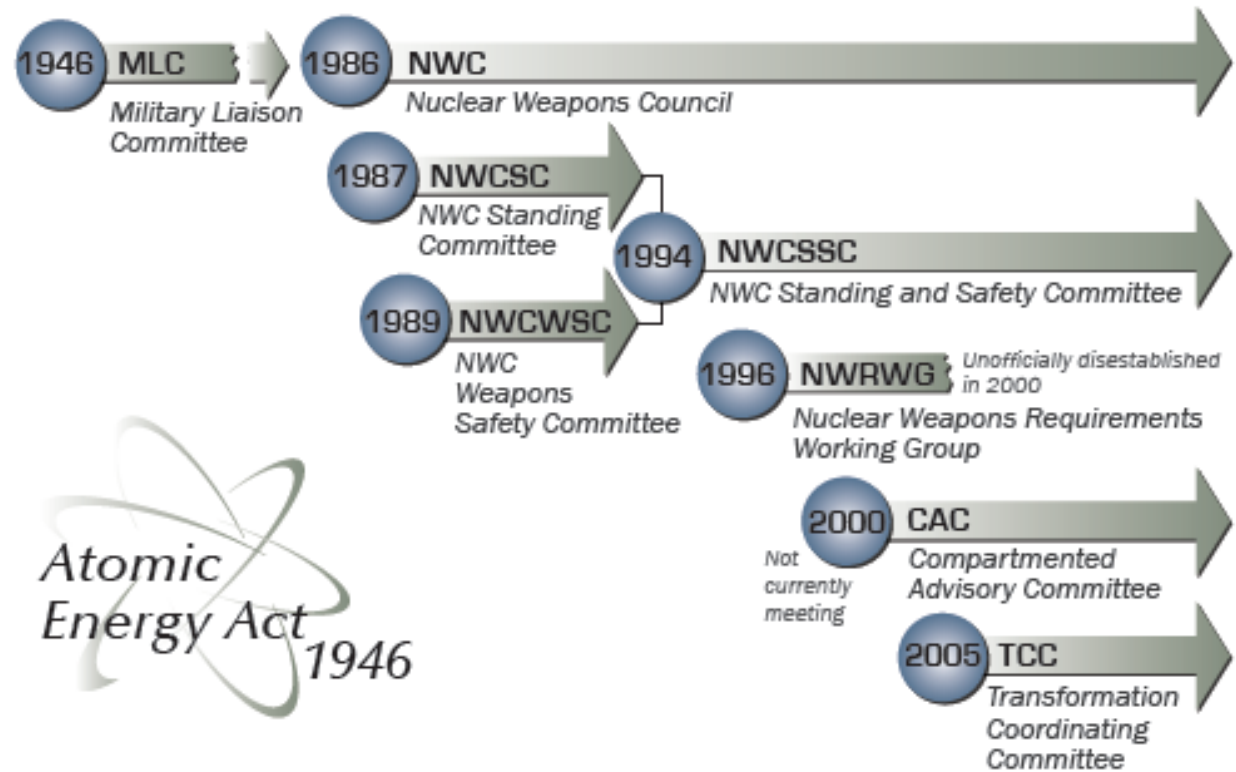
- **Supplemented:**
 - **1974**; change Atomic Energy Commission (AEC) to Energy Research and Development Agency (ERDA)
 - **1984**; incorporate the details of the 1983 DoD/DOE Memorandum of Understanding (MOU), Objectives and Responsibilities for Joint Nuclear Weapon Activities, providing greater detail for the interagency division of responsibilities
 - **1988**; incorporate the Nuclear Weapons Council (NWC)

Joint Nuclear Weapon Life Cycle Responsibilities



Key Players in the Life Cycle Process

- Nuclear Weapons Council (NWC)
- Nuclear Weapons Council Standing and Safety Committee (NWCSSC)
- Project Officer Groups (POGs)



Nuclear Weapon Council

Council Composition

Five voting members

DoD and DOE staff members

Guest organizations

Observer organizations

Chair
USD(AT&L)

Staff Director and
Executive Secretary
ASD(NCB)

MEMBERS

Vice Chairman,
Joint Chiefs of Staff

NNSA
Administrator

Under Secretary
of Defense (Policy)

Commander,
U.S. Strategic Command

Nuclear Weapon Council

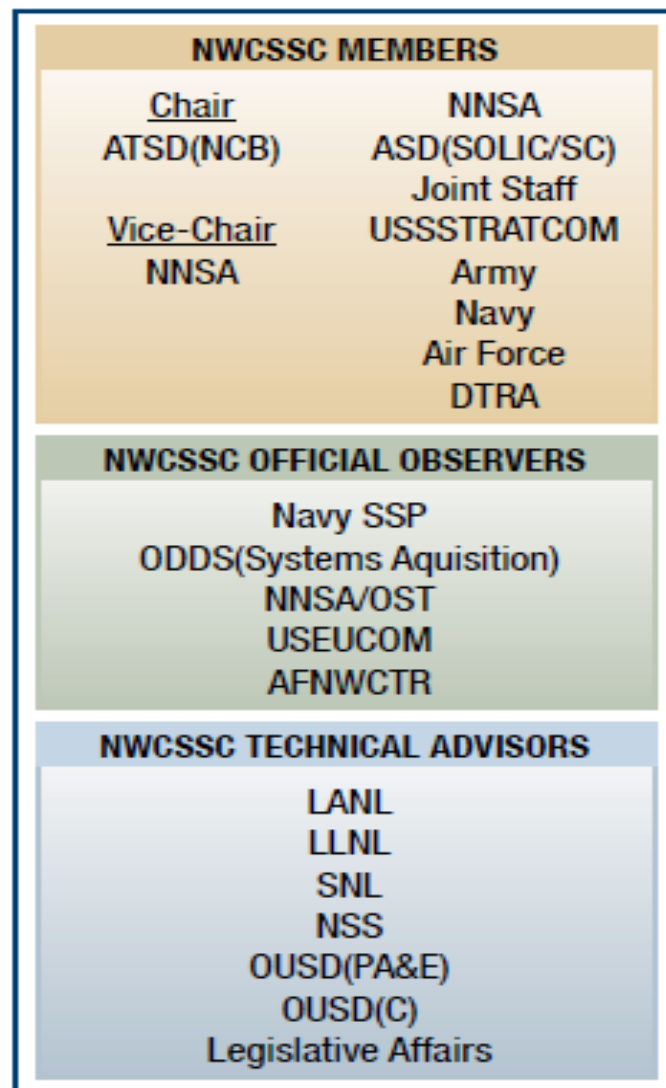
▪ Responsibilities

- Evaluate, maintain, and ensure safety, security, and control of the nuclear weapons stockpile
- Develop nuclear weapons stockpile options
- Annual certification of the sufficiency of the DOE/NNSA budget request to meet the NWC stockpile requirements
- Annual reporting requirements

NWC Standing Safety Committee

■ NWCSSC

- Develops, coordinates, and approve most actions before NWC review and final approval, including the annual NWC reports to the President and to Congress
- Actively participates in Project Officer Group (POG) oversight activities



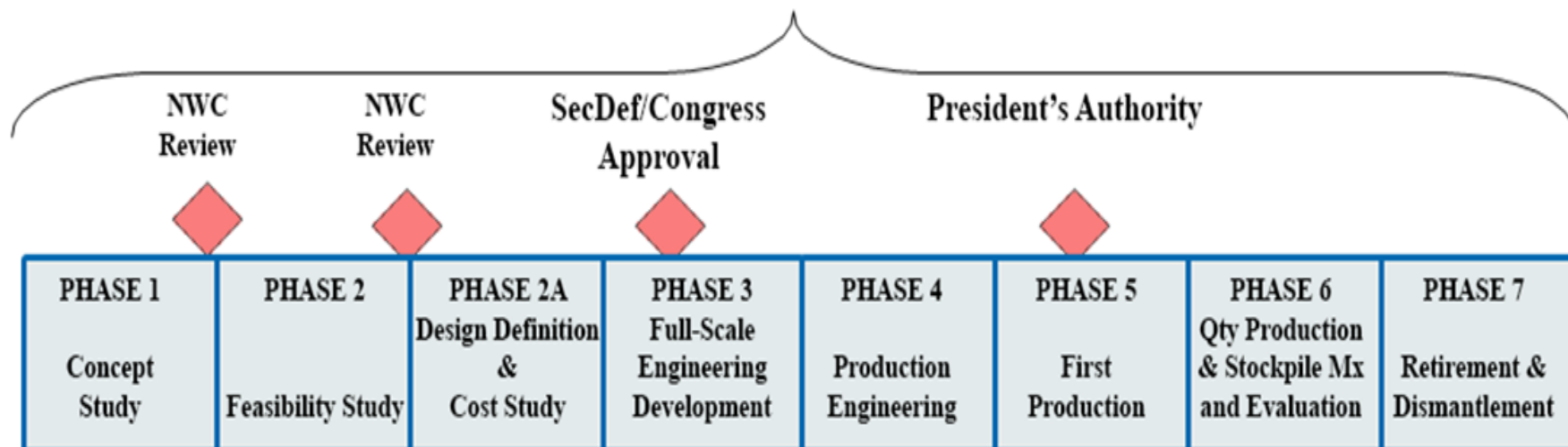
Project Officers Group (POG)

- **POG for each weapon system**
 - Joint DoD-DOE/NNSA
 - Coordinates nuclear weapon development and compatibility assurance
 - Manages major actions on weapons (e.g., life extension programs)
 - Collects and submit information to the NWCSSC and then the NWC for approval

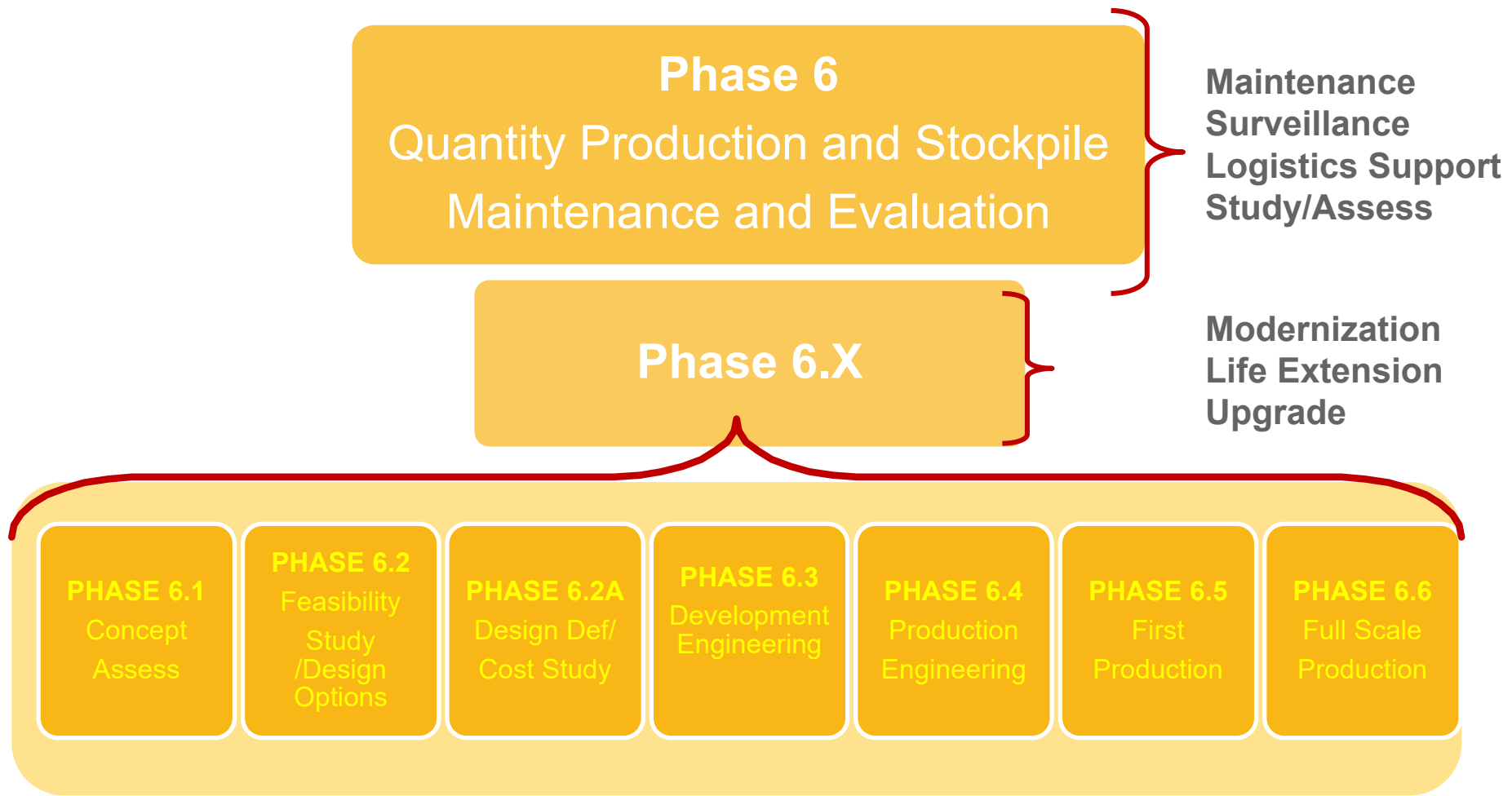


Joint Nuclear Weapon Life Cycle Phases

Joint DOD/NNSA



Phase 6.X Process



Phase 6.1 Concept Assessment

- **Continuing studies by DoD, DOE/NNSA, and POG**
 - Continuous assessments determine what areas require additional attention or component refurbishment to meet DoD and DOE/DOE/NNSA needs
 - If concepts are assessed as valid, the POG determines if a formal program study is warranted or whether the activity should be managed as a POG maintenance action outside the 6.X Process

**The NWCSSC determines whether
a Phase 6.2 study should be authorized.**

Phase 6.2 Feasibility Study and Design Options

■ The POG:

- Develops design options and assesses the feasibility (e.g., cost, schedule, and technical maturity)
- Consider options based on developed criteria to include tradeoffs and courses of action depending on MCs, STS, timelines, and budgetary and resource constraints to meet the needs for a particular nuclear weapon.

**Results briefed to NWCSSC
determine feasibility of 6.X process**

Phase 6.2A

Design Definition and Cost Study

DOE/NNSA with Labs

- IDs production issues
- Develops plans and workload structures
- Refines design to meet specific requirements
- Develops *Weapon Design and Cost Report (WDCR)*

Lead Military Service

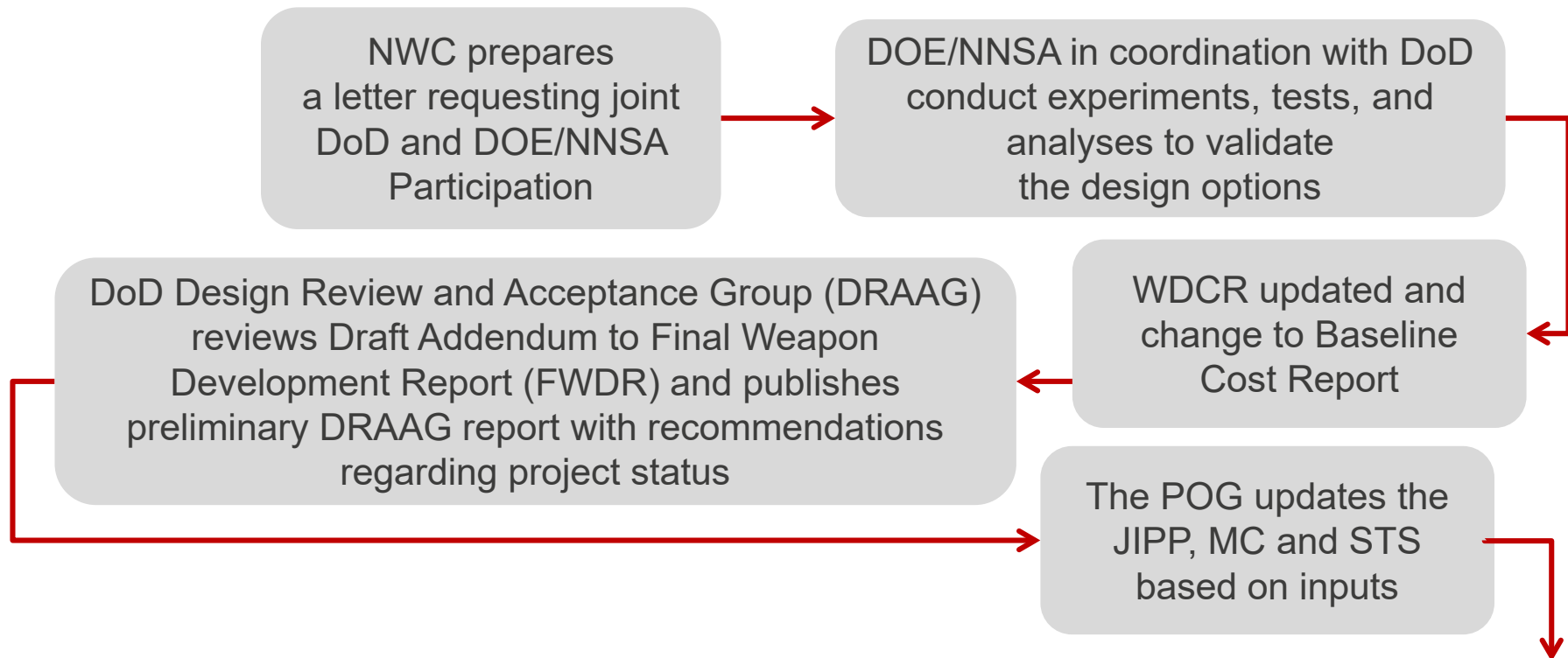
- Develops required plans and requirements
- Flight testing
- Maintenance and logistics
- Procurement of trainers
- Handling gear
- New DoD components

POG

- Develops Joint Integrated Project Plan (JIPP)
- Presents WDCR, DoD cost estimate, and recommendation on proceeding to Phase 6.3 to NWCSSC

**NWCSSC determines if
Phase 6.3 should be authorized**

Phase 6.3 Development Engineering



**Forwarded to NWCSSC for approval.
Design is demonstrated to be feasible in terms of safety,
use control, performance, reliability, and producible**

Phase 6.4

Production Engineering

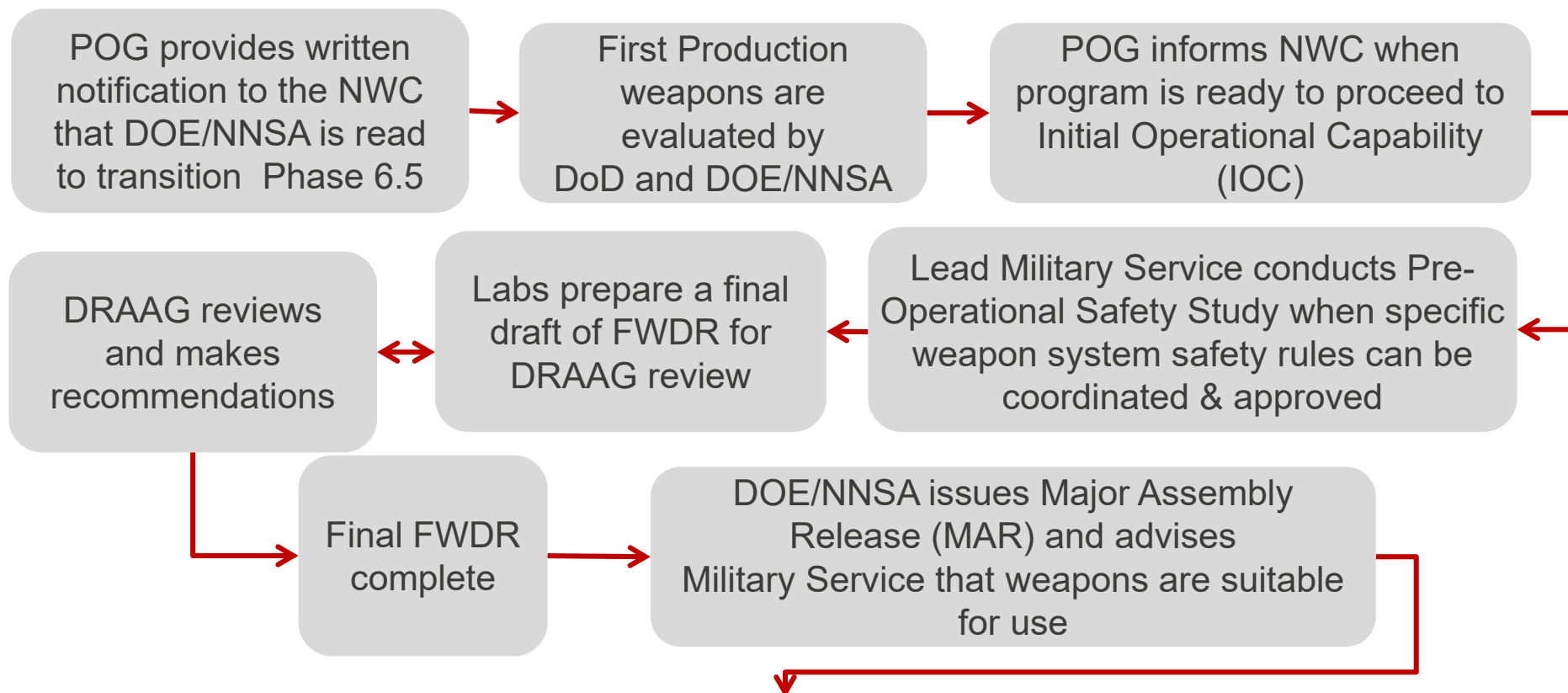
- **Phase deliverables include:**

- Adapt developmental design into a producible design
- Testing developmental prototypes for operational validation
- Conducting a laboratory task group and joint task group review to validate proposed procedures
- Technical Publications (TP) are updated & validated
- Provisions made for spare components
- Updates budgets and the Stockpile Evaluation Program

Phase 6.4 ends with completion of production engineering, basic tooling, layout, and adoption of fundamental assembly procedures, and when DOE/NNSA engineering releases indicate that the production processes, components, subassemblies, and assemblies are qualified

Phase 6.5

First Production



Phase 6.5 terminates with DoD acceptance actions, as conveyed in a letter from the Military Department and/or the NWC chairman to the NNSA Administrator. POG requests approval from NWC to proceed to Phase 6.6

Phase 6.6 Full Scale Production

- **NWC authorizes DOE/NNSA begins full-scale production**
 - DOE/NNSA provides a briefing to the NWCSSC outlining the plans and schedule to complete full-scale production.
 - The POG prepares an End-of-Project Report that serves as the final JIPP and documents the details at each phase of the 6.X Process.
 - The DOE/NNSA delivers and releases refurbished weapons into DoD custody on a schedule agreeable to both the DoD and the DOE/NNSA.

Phase 6.6 ends when all planned activities, certifications, and reports are complete.

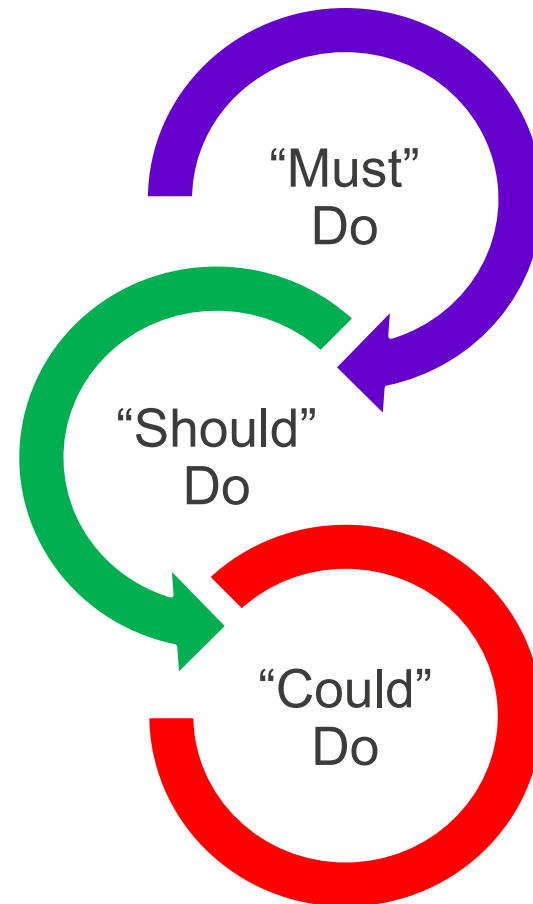
Summary of Phases 6.1–6.6

- **Phase 6.X three main points:**
 - Process mirrors the original Joint Nuclear Weapons life-cycle Process with Phases 1–7
 - Basic process is to develop a warhead; Phase 6.X intended to develop and field only components that must be replaced as part of the approved refurbishment program for legacy type warheads
 - The NWC reviews and approves proposed
 - Alterations (alts)
 - Modifications (mods)
 - Life extension programs (LEP)

Refurbishment Activities

Planned Upgrades

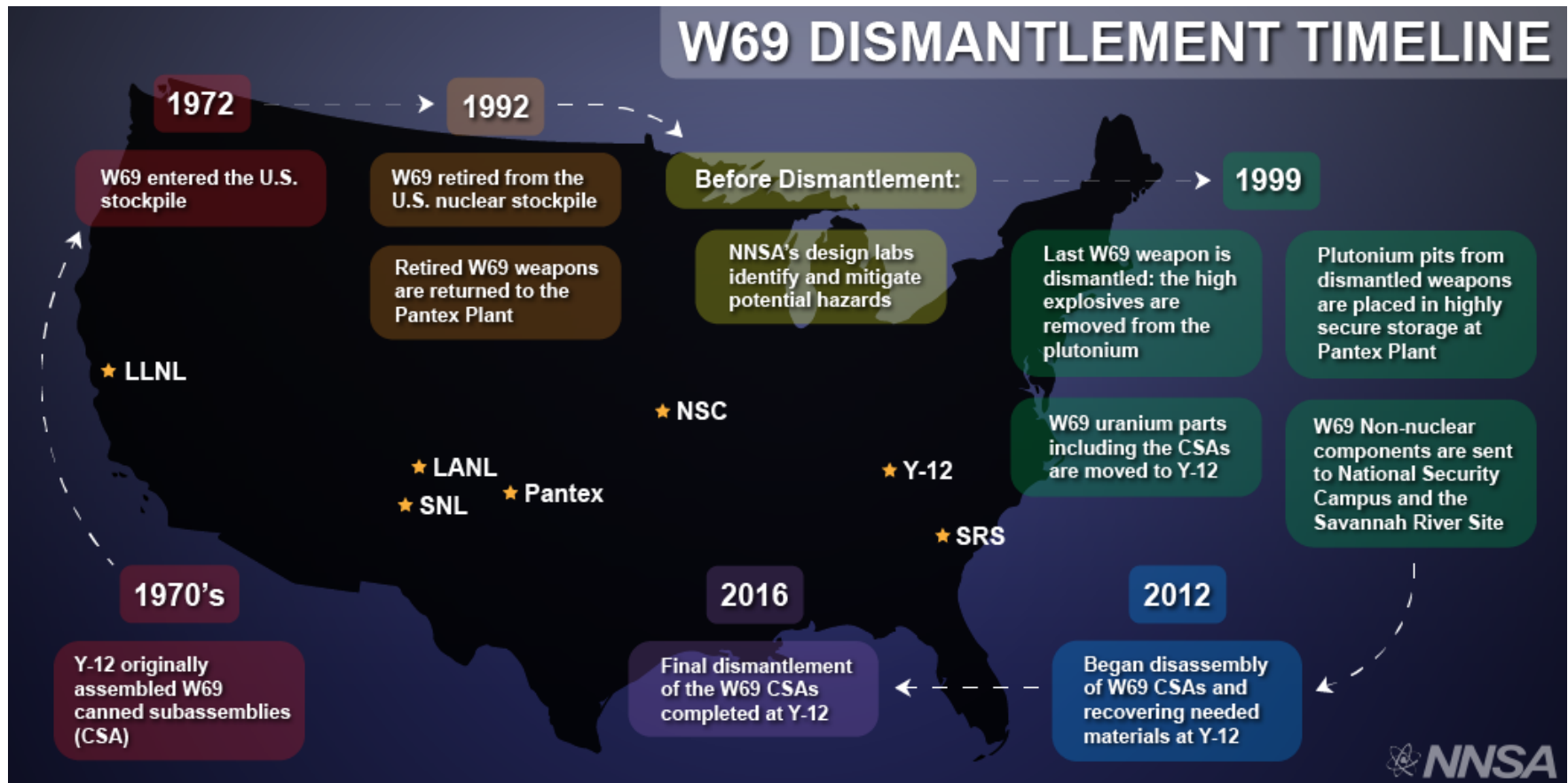
- Alterations
- Modifications
- LEPs
 - Modernizations and revised military requirements
 - Must balance resources and requirements
 - Ranked on merit:
 - “Must” do
 - “Should” do
 - “Could” do



Maintenance

- **Routine maintenance**
(typically performed by Service)
 - Limited life component exchange
 - Reservoirs, power supplies, neutron generators, gas generators
- **Planned upgrades**
(performed by DOE/NNSA or Service using provided kits)
 - Alterations (alts) and modifications (mods)
 - New technology
 - Component replacement
 - New requirement

Phase 7 Retirement

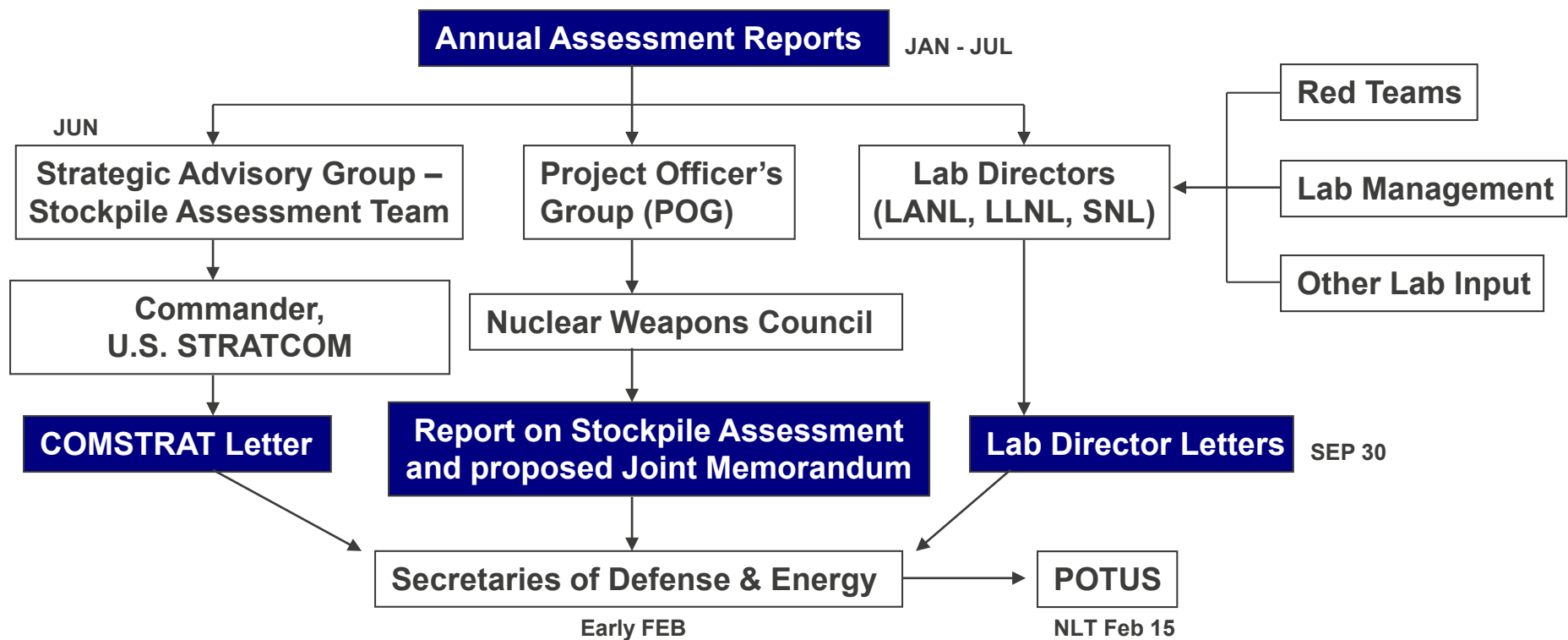


Annual Assessments

- **Annual assessments**
 - President directed *annual certification* in absence of Underground Testing (UGT), 11 Aug 1995
- **Following the Comprehensive Test Ban Treaty (CTBT)**
 - Safety/Reliability/Performance
 - Report to SECDEF, Sec of Energy, and President
- **DOE and DoD must jointly request to resume underground testing, if necessary**

Annual Assessment

President directed annual assessments of U.S. nuclear weapons in the absence of underground nuclear testing (11 Aug 1995)



Annual Reporting Requirements

- **Five annual reporting requirements:**
 - Nuclear Weapons Stockpile Memorandum/Requirements and Planning Document (NWSM/RPD); September 30
 - NWC Report on Stockpile Assessments (ROSA); February 1
 - NWC Joint Surety Report (JSR); March 31
 - NWC Chairman's Annual Report to Congress (CARC); Fiscal Year
 - NWC Budget; Fiscal Year

Annual Reporting Requirements

- **Nuclear Weapons Stockpile Memorandum/Requirements and Planning Document (NWSM/RPD)**
 - An annual memorandum to the President from the Secretaries of Defense and Energy. The NWSM transmits a **proposed presidential directive**, which includes the proposed Nuclear Weapons Stockpile Plan (NWSP). The NWSP specifies the **size** and **composition** of the stockpile for a projected multi-year period, generally the Future Years Defense Program (FYDP) period

Annual Reporting Requirements

- **NWC Report on Stockpile Assessments (ROSA);**
 - Annual reporting and **certification requirement** that will ensure that our nuclear weapons remain safe and reliable under a comprehensive test ban

Annual Reporting Requirements

- **NWC Joint Surety Report (JSR);**
 - Assesses, at a minimum, nuclear weapon **safety, security, control**, emergency response, **inspection and evaluation programs**, and the impact of budget constraints on **required improvement programs**. This report also addresses the **current status** of each of these subject areas as well as the impact of **trends affecting capabilities** and the nature of the threat

Annual Reporting Requirements

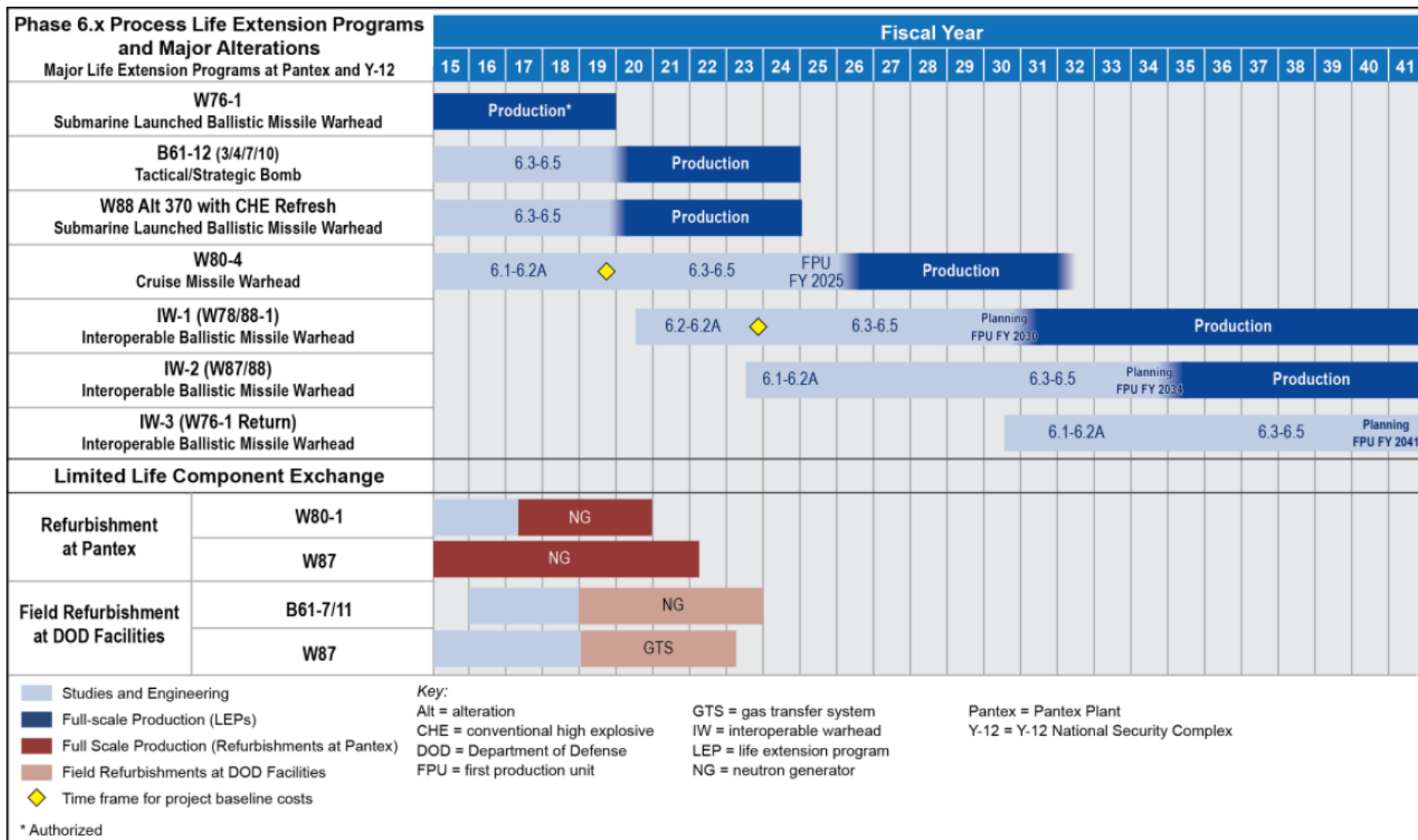
- **NWC Chairman's Annual Report to Congress (CARC)**
 - Contain a **description of all activities** conducted by the DOE/NNSA during the reporting period, as well as all **nuclear weapons-related activities planned** for the following fiscal year that have been approved by the NWC for the study, development, production, or retirement of nuclear warheads.

Annual Reporting Requirements

■ NWC Budget

- The budget certification is an NWC agenda topic, usually beginning in November, and the members discuss how the DOE/NNSA is forming its request to meet DoD needs, as laid out in the current endorsed stockpile profile. Annually the DOE/NNSA provides a line-by-line breakout of its budget for the members to review while the DoD-CAPE typically provides the final review before the draft certification letter is coordinated with the NWC members

Current Refurbishment Activities



Thank you!

Questions?

